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Semomesia geminus (Fabricius, 1793) (Lepidoptera: Riodinidae: Mesosemiini): First records for Rio de Janeiro and Pernambuco states, range extension and distribution map, with an assessment of its potential wider occurrence in Brazil

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ABSTRACT: We report the first records of *Semomesia geminus* (Fabricius, 1793) from Rio de Janeiro (RJ) and Pernambuco (PE) states, expanding the known species range (Bahia-BA, Espírito Santo-ES and Minas Gerais-MG states) 700 km further south and 1200 km north of typical localities in ES. The taxon was photographed twice in Reserva Ecológica de Guapiaçu (REGUA) and two additional RJ specimens have since been located in museum collections. A distribution map build upon specimens' label data is presented and a much wider range extension revealed and discussed. Observations on its perching habits, with potential taxonomic significance, are supplied.

The genus *Semomesia* Westwood [1851] (type species: *Papilio croesus* Fabricius, 1777; *Genera Insectorum*: 259) is a small genus of hitherto poorly known, strong sexually dimorphic, forest metalmarks featuring conspicuous 'eyes' (*ocelli*) on the wing pattern. The males are metallic bluish and the females usually brownish. The species included were removed from *Mesosemia* Hübner, [1819] (type species: *Mesosemia phicoclessa* Hübner, [1819], repl. name for *M. philocles* (Linnaeus, 1758); Verz. bek. Schmett. (2): 21) based on the peculiar presence of male androconial patches on the costal area of the hindwing recto. The genus was included in the tribe Mesosemiini by Harvey (unpublished data), primarily on the basis of the males possessing a ventrally divided genital pedicel and secondarily for having setose eyes.

Most species of Mesosemiini are lowland to medium altitude forest dwellers, quite localized, rarely seen and easily overlooked in the field even by experienced researchers. Their biology is virtually unknown to science. The genus *Semomesia* extends mainly from the central and eastern Amazon basin into the Guyana shield. However, two taxa do occur in southeastern Brazil: *S. croesus croesus* (Fabricius, 1776) and the Atlantic Forest endemic *S. geminus* (Figure 1). Both are inhabitants of the Atlantic Forest biome, a priority among Global Biodiversity Hotspots in terms of conservation (Myers *et al*. 2000).

S. geminus is not on the Brazilian 'red list' of threatened Lepidoptera (Mielke and Casagrande 2008); however, data on *Semomesia* species range, distribution and local occurrence is quite scattered and missing for many of them. Adults are seldom found in the field and are thus quite rare or very scarce in collections (D'Abrera 1994) and the authors would like to call attention to the fact that the last *S. geminus* records retrieved in this research are from the late 70's (see data further down) and 90's (AVL Freitas, *per. comm.*) of the 20th century. Accordingly, the recent sightings of two male individuals at REGUA (22°27'14" S, 42°46'18" W), in the vicinity of the Três Picos State Park (PETP) located at the Eastern tip of the of the Serra dos Órgãos, in less than a one year interval, prompted our interest to reevaluate the distribution of this taxon. For that, the previous historical range of the Atlantic Forest biome coupled with the screening of available specimen label data in collections were used as a framework to ascertain its present day distribution. According to published records (D'Abrera 1994, Brown

FIGURE 1. *Semomesia geminus* ♂ (top left dorsal, bottom left ventral) costal length 17 mm. "Guandú, Esp.St.o, X.1920, coll. code 54/140, ex-col. Julius Arp", MNRJ. ♀ (top right dorsal, bottom right ventral) costal length 19 mm. "Esp.St.o, coll. code 54/145, ex-col. Julius Arp", MNRJ.

and Freitas 2000) and the museum specimens familiar to the authors (MNRJ and DZUP collections), *S. geminus* is known to occur from South BA (Camacã) to ES (Colatina, Conceição da Barra, Santa Teresa) and MG (Santa Bárbara, São Jacinto valley). We are now in a position to register this species as a new RJ record and add further data on its distribution as follows below.

Behavioral notes. On November 29, 2010, around 13:00 with sunny weather, a male *M. geminus* individual was photographed by Alan Martin perching on an understory leaf at 300 m above sea level, in a stretch of REGUA's Green Trail (22°24'8.9" S, 42°44'13.6" W) consisting of old secondary (>70 years) and logged pre-montane forests. On September 30, 2011 more photos of another male (Figure 2) were taken by Michael Patrikeev around 14:45 (+31° C, 57% humidity) perching on the top of the Red Trail (22°23'19.20" S, 42°44'53.50" W) at 1008 m altitude, a spot frequently used by local hilltoping butterflies (Figure 3); around 15:15, another male was seen perching at 900m on the mountain saddle area connecting the Red Trail to the Blue Trail. This area is covered by a montane type of moist forest very rich in Bamboos, Arecaeae, Ericaceae, Bromeliaceae and Orchidaceae (Figure 3), locally known as 'Elfin forest' (Miller *et al.* 2006).

Figure 2. A *S. geminus* male perching on the top of the Red Trail, 1008m, 14:45, 30th September 2011. [Michael Patrikeev]

Museum specimens examined - Museum acronyms used: BMNH (Natural History Museum, London); DZUP (Departamento Zoologia, Universidade Federal do Paraná); MNRJ (Museu Nacional do Rio de Janeiro). **BRASIL.** - **Amazonas** [**Acre**?]: Alto Juruá, 1♂, coll. code 37/264 (MNRJ). **[Distrito Federal?]:** Brasilia, 1♂ (BMNH). **Bahia:** [no loc.], 1♂ (BMNH); Camacã [Camacan] (S. João do Paraíso, 30 km N [S] de Camacã), 1♂, 22-VII-1977, Mielke, Moure e Elias leg. (DZUP). **Minas Gerais:** [no loc.], 1♂ (BMNH); Theophilo Ottoni [Teófilo Otoni] (Vale de São Jacinto), 1♂, 1907, Birch leg (BMNH); [Santa Barbara] ([Serra do] Caraça), 1♂, P. Germain leg. (BMNH). **Espírito Santo**: [no loc.], 1♂, coll. Code 54/143, ex-coll. Fhrusthorfer and J. Arp (MNRJ); 6♂ and 1♀ , ex-coll. Fhrusthorfer (BMNH); Conceição da Barra, 1♂, 12-IV-1969, C. and C. T. Elias leg. (DZUP); Guandu [Baixo Guandu], 2♂ and 1♀ 02-X-1920, coll. code 54/140; 54/141; 54/144, ex-coll J. Arp (MNRJ); 2M, XI-1920, ex-coll. Arp and Gagarin (DZUP); 1♂, 1-IV-1970, C. and C. T. Elias leg. (DZUP); [Baixo Guandu?], 1♂ and 2♀, coll. Code 54/142; 54/145; 54/146 (MNRJ); Collatina [Colatina], 1♂, E. M. Augusto leg. (MNRJ); Linhares, 1♂, I-1978, C. Elias leg. (DZUP); S. Thereza [Santa Teresa], 1♀, [1920?], ex-coll. Arp and Gagarin (DZUP). **Rio de Janeiro:** Santo Antonio dos Brotos [Miracema] ('São Fidelis'), 2♂, 1876-1882, Vincent de Lyon leg. (BMNH).

The records above were mapped using DIVA-GIS software, resulting in an up-to-date distribution map for *S. geminus* (Figure 4). The area richest in records (21, or 63% of retrieved records) is confirmed to be ES. Two unnoticed old specimens from a northeastern RJ locality, completely deforested today (Miracema, 21°24'41.9" S, 42°11'36.0" W), were uncovered in the BMNH collection (data above) and thus added to the new RJ records. Its occurrence in BA is here confirmed and 'officially' published.

The existence of a further interesting specimen from Pernambuco (PE) state was mentioned (O. Mielke and C.G.C Mielke *per. comm.*) but the first author was unable to locate it in the DZUP Lepidoptera collection to check its label data (could be in their private collection). However, further communication with Olaf Mielke provided the precise locality, confirming a new PE record and range extension for *S. geminus*: RPPN Frei Caneca, Jaqueira, Pernambuco. This is a private 630 ha reserve (8°42'41.0" S, 35°50'30.0" W), between 500-750 m above sea level, with granite *inselbergs* surrounded by important fragments of montane Semi-deciduous Mesophytic forest (Andrade-Lima 1982). Local climate is tropical, with a mean annual temperature of 22°C. There is a 4–5 month dry season between October and February and a rainy season between March and September (IBGE 1985).

Figure 3. A view of the montane 'Elfin Forest' from the Hilltop of the Red Trail (1008 m). [Thor Østbye]

Two unlikely records, one from 'Brasilia' [sic] and other from the upper Juruá River are difficult to catalogue because the first one lacks basic data (such as date, collector and any additional information) and in some European languages the name 'Brasil' could be spelled as 'Brasilia'; and the second bears a scanty data label layout typical of Prince Gagarin's collection, which according to the second author (with a first hand knowledge of the MNRJ collection origins and history), has several specimens wrongly labelled. If confirmed, this would be an exceptional range extension. Given that most species of the genus are Amazonian lowland forest dwellers and that the Atlantic Forest had historical connections with

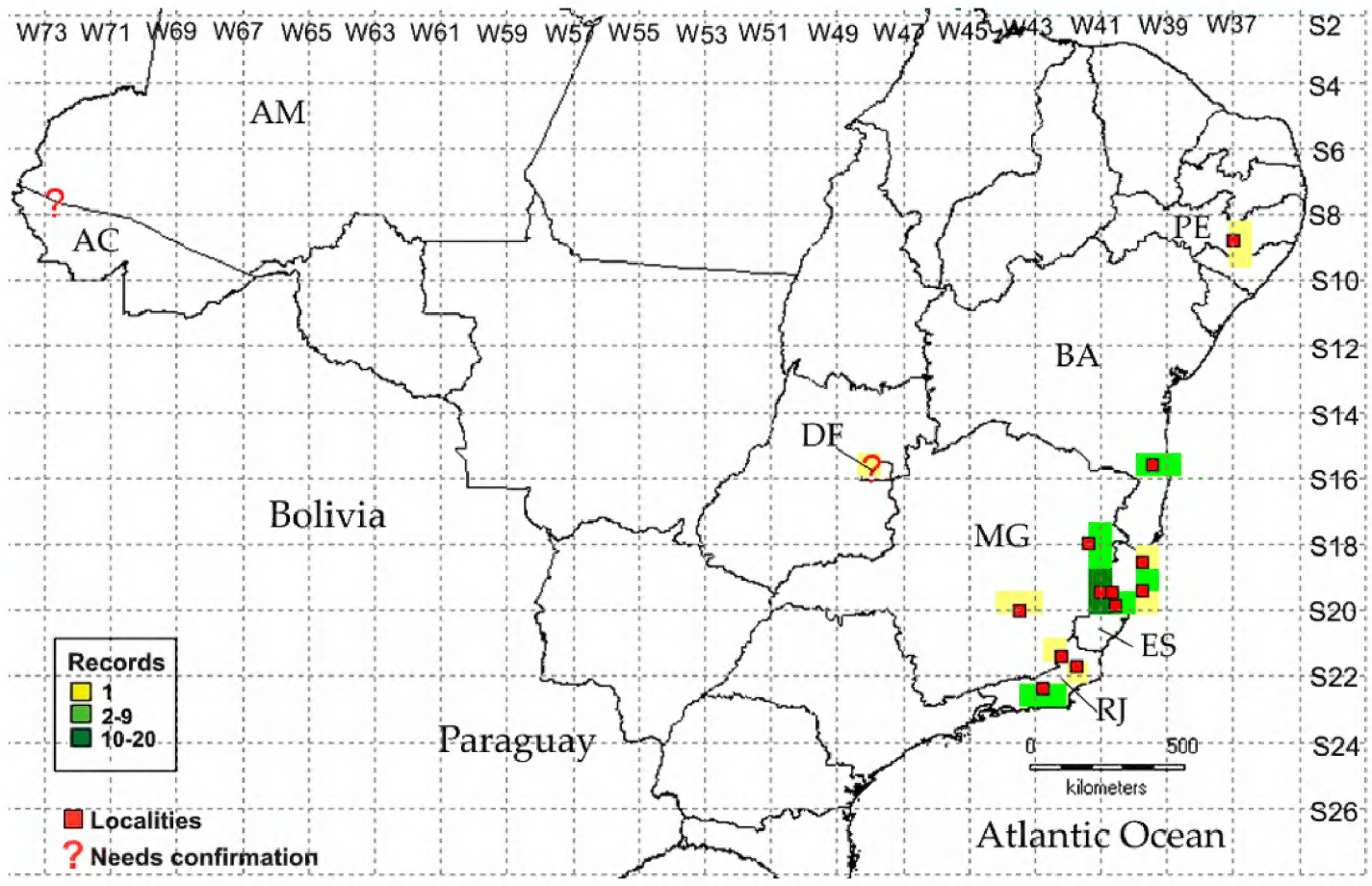

Figure 4. Distribution map and number of observations of *S. geminus* (DIVA-GIS software).

the Amazon, the presence of *S. geminus* there would fit that pattern. Its occurrence in the Cerrado biome, around Brasilia, would be more difficult to explain, but the Federal District's flora and fauna of the gallery forests have an Atlantic origin (Brown and Freitas 2000); accordingly if *S. geminus* is present there, riparian forests would be the peculiar places to look for it. On the other hand, its stronghold position in ES – a state featuring the presence of many relict species (Brown and Freitas 2000) – might point to a relict status for *S. geminus* also. Its presence in the upper Juruá River of the Amazon is therefore difficult to reconcile with this presumed relict status and known distribution, and the lack of additional records from neighboring areas in the upper Amazon makes this record most unreliable. So this issue must remain unanswered until further field sampling and private/public collection screening sheds more light on the subject.

Perching position and taxonomy. Some pertinent remarks brought about by these RJ live sightings are highlighted in view of their potential implications on the systematic position of *S. geminus*. Hall (2003) wrote a phylogeny paper of the five forewing radial branching Riodininae genera, using exclusively the type species of the genera in the analysis. Further on, in the discussion, he states that the bulk of Mesosemiina (*Mesosemia* and *Semomesia*) might be polyphyletic and, commenting on his character 1 (resting position) - exemplified by a single perching *Mesosemia* illustration - included *S. croesus* (and by implication, all *Semomesia*) in the "resting with wings half open" group. That character assignment is bluntly shown not to be the case in the two live *S. geminus* male specimens photographed, both exhibiting a 'fully open' wing resting position during the entire sighting (not only flicking at the moment of the shot, Patrikeev *pers. com*). Furthermore, a Google image search output includes more 'wild' photos of *Semomesia spp*. perching with fully open wings (*e.g.* see photobase Flickr 2011).

At last, the rather unusual wing pattern of *S. geminus* is immediately obvious to any taxonomist who opens a drawer of *Semomesia*: the male wing's basic layout is simplified (with less dark bands), the *ocellus* is absent from the male forewing, the shape of both wings is peculiar and the bluish shine of the female is unusual in the genus. It is the author's hope that this note might spark interest and call attention to this small group of wonderful and elusive forest metalmarks, to such an extent as to prompt further investigation on their generic status, ecology and biology.

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